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UTILIZATION ANALYSIS OF A PEDESTRIAN SAFETY TRAINING PROGRAM

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A previously developed and analyzed pedestrian safety training program was used to teach appropriate street-crossing behaviors to kindergarteners and first graders. Adult crossing guards were trained to provide pedestrian safety instruction. Trained observers monitored the quality of instructions given by crossing guards and the pedestrian behavior of young children as they crossed the street. A multiple-baseline analysis of the effects of two training programs indicated that guards were able to deliver the pedestrian safety program to several groups of children with a high degree of competence after receiving a single videotape and role playing training session. Furthermore, children's level of appropriate street crossing increased contemporaneous to the change in guard behavior both on the street where training was delivered and on a second street where no training was previously delivered. Utilization analysis of the guard training program indicated that one cannot expect to produce consistently high levels of street-crossing behavior by implementing only the "show and tell" portions of the training package. Similarly, results suggested that one is unlikely to produce consistently high quality guard training behavior by only giving written instructions describing how pedestrian training should be administered.

DESCRIPTORS: pedestrian skills, utilization training, evaluation research, behavioral community psychology, children

A steadfast tradition in applied behavior analysis since its inception has been the demonstration of the solution of socially significant problems (e.g., Baer, Wolf, & Risley, 1968). Historically, this analysis has emphasized the control of individual behavior and has relied on a relatively small number of subjects to argue the point of the demonstration (Michael, 1974). Though the emphasis on control of individual behavior has not diminished, the effectiveness of existing technologies of behavior change on larger subject populations is open to empirical question (O'Leary, 1977).

One subspecialty area within applied behavior analysis that has concerned itself with the study of larger subject populations has been termed "behavioral community psychology" (Briscoe, Hoffman, & Bailey, 1975; Fawcett, Mathews, & Fletcher, 1980; Glenwick & Jason, 1980). The dissemination of existing technologies of behavior change to expanding spheres of influence as large as the community and evenutally to state and national levels would most plausibly proceed through demonstration and community levels of analysis prior to large-scale implementation. This type of successive-stage model (Yeaton, Greene, & Bailey, 1981) which validates effectiveness in gradually increasing increments has the advantage of confronting problems at a level where difficulties due to scale are likely to be minimal. If procedures do not prove to be

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effective in small-scale application, it is difficult to imagine success in larger scale settings.

Pedestrian safety is a topic area within behavioral community psychology that may be used to demonstrate the successive-stage model. Page, Iwata, and Neef (1976) taught pedestrian safety skills to six retarded persons using individualized instruction by staff expert in behavioral training techniques. Yeaton and Bailey (1978) demonstrated the effectiveness of a pedestrian training package with small groups of normal children at two schools and presented individual data for each of the 24 students trained. The extension of this training program to much larger numbers of young children at many schools is a logical direction to proceed.

At the community level there are several critical questions that must be asked regarding utilization of existing technologies. Two of these questions center around the choice of the appropriate change agent for teaching pedestrian safety and the choice of the mode of training. First, adult crossing guards have been recommended to serve in an instructional capacity (Jones, 1979). They are often present in the children's environment and can give feedback to children on a regular basis. Also, paraprofessional trainers may produce programmatic change equal or superior to that produced by professionals (Durlak, 1979).

The second question concerns the choice of a treatment most likely to bring about immediate and substantial change. Given the potential lifesaving nature of the behaviors of interest, we wished to choose the strongest treatment available (Yeaton & Sechrest, 1981) that was also reasonably convenient. A videotaped version of a crossing guard delivering training was chosen since it could be made easily and shown conveniently to each guard. Additionally, a role playing session was to be conducted at the same intersection where a small group of children would eventually be trained. Role playing required little time and allowed us to give direct, immediate, and individualized feedback to each guard.

A utilization analysis of newly developed technology should also evaluate those alternate scenarios likely to be followed during realistic implementation of instructional methods (Lowe & Lutzker, 1979). Ideally, the necessity of the chosen intervention should be established by asking if all of the procedures in the recommended program are necessary for equally effective modification of behaviors. Reduction of the program to its functional components is critical since extraneous training efforts waste both valuable time and money, and financial constraints represent a potent dimension in the effectiveness of effective behavioral treatments (e.g., Bunck & Iwata, 1978; Little, 1968).

The decision to develop a training program to teach young children pedestrian safety skills was based on three rationales. First, data from the National Safety Council (Accident Facts, 1979) and the state of Florida (Traffic Accident Facts, 1979) indicated that young children are an especially at-risk subgroup for pedestrian deaths and injuries. Second, unobtrusive videotaped observations taken at the end of the school day from inside a van parked near pedestrian crosswalks at eight crosswalks located near elementary schools suggested that children were deficient in utilizing pedestrian safety behaviors (Yeaton, Note 1). The average percentages of correct responding for five selected pedestrian safety components were: wait at curb, 12%; look left, right, 10%; walk across street, 59%; continue to look, 19%; and use crosswalk, 67%. (The average reliability between two observers who watched the same videotape was 90%.) Third, when children received a prompt urging safe street crossing ("I know you know how to cross the street. Now I want to see how carefully you can cross."), a multiple-baseline analysis demonstrated the absence of behavioral change (Yeaton, Note 1).

The primary purpose of this research was to evaluate two separate but related training programs. The first training program, the Guard Training Program (GTP), used videotape and role playing procedures to teach adult crossing

guards how to train kindergarteners and first graders to use pedestrian safety skills. The second training program, the Pedestrian Safety Instructional Package (PSIP), was designed to teach young children to cross the street safely. The PSIP had been field tested previously but had not been implemented by existing safety personnel. Therefore, it was necessary to determine both the effects of a videotape and role playing training package (the GTP) on the quality of instruction given by crossing guards and the effects of the PSIP given by crossing guards on the street-crossing behaviors of young children.

GENERAL METHOD

Children and Setting

The PSIP was administered to 522 kindergarteners and first graders in nine Tallahassee schools during the course of the school year. The results of 108 children who participated in the training are reported here. Selection of this subset of children was arbitrary, being based on availability at the time a decision was made to conduct an experiment at a given school. Complete results appear in an expanded version of this paper (cf. Yeaton, Note 1).

All children who participated in these experiments were chosen arbitrarily from an initial pool of kindergarteners and first graders whose parents had returned written permission to the school for their children to receive pedestrian safety training. In most instances, children were bused or picked up by an adult at the end of the school day.

Pedestrians were always trained on the sidewalk next to the crosswalk where a crossing guard was regularly stationed. These crosswalks were located both at the intersections of two streets and in midblock but always on a street adjacent to school property.

The GTP was given to 17 crossing guards who worked in close proximity to the nine city schools where the PSIP was implemented. There was considerable variation among guards in their age and educational background. Three guards were unable to deliver the complete PSIP in a skillful manner after guard training but assisted with portions of the training program. The training performance of six guards, five females and one male who ranged from recent high school graduates to retirees, is reported here. These guards were selected on the basis of their presence at an experimental school where a particular study was to be conducted.

Pedestrian Training

The PSIP was given in four phases to small groups of children during each session.

1. "Tell them." The crossing guard told the children the safety steps appearing on a poster specially constructed to increase the likelihood that consistent and thorough instruction would be given each day. The pedestrian training steps were not necessarily given by the guard in the order in which they appeared on the poster. Correct responding included an instruction that conveyed the same essential message as a step listed on the poster (e.g., "Keep looking" for "Continue to look" or "Don't run" for "Walk").

2. "Show them." The crossing guard demonstrated the correct method of crossing the street, adding verbal instructions to accompany correct motor behavior.

3. "Ask them." The crossing guard asked each child to approach the curb and to practice stopping and looking for cars. Each child was also instructed to tell the guard what safety steps to follow when crossing the street. Feedback (either descriptive or general praise, or correction) was given to each child.

4. "Let them." The crossing guard let each child cross the street one by one and gave feedback regarding correct crossing.

Response definitions. The pedestrian behaviors that were trained and the definitions of these behaviors were virtually identical to those used previously by Yeaton and Bailey (1978). The only exception was the "watch vehicle distance" category which was systematically taught but not monitored since the children always crossed the

street in the presence of a crossing guard. Five components were monitored and used to define safe street crossing.

1. Wait at curb. The child comes to a complete stop on the curb (or on the edge of the roadway) within one second of initiating a crossing.

2. Look left, right. Before initiating a cross, the child will look in all possible ways that the traffic may pass prior to entering the street. This is accomplished by looking left and right during the period after reaching a position 5 feet (1.5 m) from the entry point to the street and before the child's foot touches the street to begin crossing. Each look should be at least 45° from the "straight ahead" line.

3. Walk. The child must walk to the opposite curb and not come to a complete stop while crossing the street. Nonwalking includes running, hopping, and skipping at any point in the road.

4. Continue to look. The child must look at least once in each possible direction that a car may pass after leaving the curb and before arriving on the opposite curb. This is accomplished by looking left and right with each look at an angle of at least 45° from the "straight ahead" line. The look to the left and to the right may occur at any point during the duration of the cross.

5. Use crosswalk. The child will keep both feet on or within the lines of the crosswalk for the duration of the cross.

Guard Training

On a one-to-one basis, each crossing guard was shown a 10-min videotape of a crossing guard giving training to a small group of children. Then, an individualized role play session was conducted on the street corner where the crossing guard would eventually give training to children. To avoid any classroom scheduling problems, the videotape was shown to guards from the inside of a van parked near the school. The videotape was interrupted at critical points to emphasize important facets of the training being given to children and to answer any questions that the crossing guard asked. After the videotape was shown, a role playing session was conducted on the street corner.

The first author role played a child who was to receive training from the crossing guard. The specially constructed poster listed pedestrian safety steps and the four phases of training. Using this poster as a visual aid, the crossing guard practiced giving the PSIP to the first author in this role play situation. Attention was called to the phases of training appearing on the poster so that the crossing guard would learn to respond solely to the visual aid for assistance. If the guard needed assistance to begin each phase of training, the coordinator stated briefly the necessary information to complete this portion of training. On completion of each training phase, feedback was given regarding the quality of the performance. At least one perfect execution of a phase of training was required before moving on to the next phase.

When all phases of training were completed, the first author asked the guard to use the poster to help explain exactly what should be done during each phase of training. Errors were corrected, and praise was given for appropriate responses. The complete session of guard training was completed in 30-60 min.

Response definitions. Three guard behaviors were trained.

1. Tell. The trainer told children to use the following nine safety steps: walk on sidewalk; cross on corner; use crosswalk; wait at curb; look left, right; watch vehicle distance; walk; continue to look; and use all the safety steps every time you cross the street.

2. Show. The trainer showed the children the following sequence of six safety steps to be used in crossing the street; wait at curb; look left, right; watch vehicle distance; walk; continue to look; and use crosswalk. Three safety steps were omitted from scoring since they were not part of the behavioral chain used in street crossing. Yes and No were coded for each of the 15 steps in phases 1 and 2.

3. Feedback. The trainer asked the children to practice the six safety steps *on the curb* that he or she had just showed them. The trainer gave feedback to each child as he or she waited at the curb and looked left and right and told the guard their intention to watch vehicle distance, walk, continue to look, and use the crosswalk. F (Feedback) or NF (No Feedback) was scored when the children came to the curb one at a time and interacted with the guard. Feedback consisted of any of the three categories (DP, GP, CM) listed below in Phase IV and could be given for behaviors the child had performed on the curb or said he or she would perform while in the street.

During the "Let them" phase of training, the trainer also gave feedback to the children after their cross. There were three categories of feedback given to each child.

(*DP*) *Descriptive praise.* The trainer made a praise statement to a child and named the particular pedestrian behavior he or she performed (e.g., "Great, you remembered to walk." or "John, you looked while on the curb just perfectly.").

(*GP*) *General praise.* The trainer made a praise statement to the child but did not name the particular pedestrian behavior he or she performed (e.g., "You did all the safety steps just right." or "John, you did a great job today.").

(*CM*) *Correct mistakes.* The trainer gave descriptive feedback to the child by either stating their mistake or stating the correct behavior that should have been performed (e.g., "You forgot and ran across the street." or "John, you should have looked both ways before you crossed."). DP, GP, and CM were coded for each child when given by a crossing guard.

Observation and Reliability

All observers in this study were undergraduates at Florida State University. Afternoon observations were made from a vantage point 1.5 to 7.6 m from the crosswalk where children passed. The specific positions were chosen to maximize visibility of traffic and children, minimize obtrusiveness of observation, and to ensure child safety in case of emergency. On a large proportion of the occasions when children were observed, a second, reliability observer was also present to make an independent record of street crossing (see Table 1). Observers also monitored the training behaviors of crossing guards when pedestrian training was given to children. Observers stood approximately 1.2 to 2.4 m from the guard where they could hear the guard give training yet still record responses in a relatively inconspicuous manner. Observers then crossed to the opposite side of the street from where training occurred so they could hear instances of feedback given after each child had crossed the street.

Crossing guard reliability. Reliability was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. An agreement was scored either when both observers marked yes to indicate that a crossing guard had performed a behavior correctly or when both observers marked no to indicate that a guard had performed a behavior incorrectly during phases 1 and 2 of pedestrian training. An agreement was also scored when both observers marked F (feedback) for a particular child during phase 3 of pedestrian training. During phase 4 of pedestrian training, an agreement was scored when any instance of feedback (DP, GP, or CM) by a crossing guard was scored by both observers for a given child. When a particular behavior was not observed by a primary or reliability observer, an "X" was marked in this box on the data sheet, and this information was not used to calculate reliability. A disagreement was scored when one observer marked a response yes (no) and the other observer marked the same response no (yes), one observer marked F and the other observer marked NF (no feedback), or when one observer coded an instance of feedback (DP, GP, or CM) and the other observer did not code an instance of feedback.

Pedestrian reliability. Reliability on observations of pedestrian behaviors was also calculated using the percent agreement method used with

Table 1

Pedestrian Reliability

Experiment	*Wait at Curb* (%)	*Look Left, Right* (%)	*Walk* (%)	*Continue to Look* (%)	*Use Crosswalk* (%)	*Session Range* (%)	*Overall* (%)	#P	#R	%R
1. PSIP:										
Guard P, Training street	100	95	92	95	100	87-100	96	2	4	57
Second street	96	96	90	100	100	89-100	96	2	4	67
PSIP:										
Guard C, Training street	96	93	86	96	96	77-100	93	2	4	77
Second street	100	92	93	100	100	91-100	97	2	3	67
2. PSIP:										
Guard J	93	90	93	94	93	71-100	93	4	4	67
PSIP:										
Guard S	93	96	92	94	92	83-100	94	2	3	74
3. Component Analysis:										
School D	97	94	89	85	97	81-100	92	3	6	87
School C	95	92	90	93	87	78-96	91	2	4	100

Guard Reliability

Experiment	*Show & Tell* (%)	*Feedback* (%)	*Session Range* (%)	*Overall* (%)	#P	#R	%R
1. GTP:							
Guard P, Training street	95	97	90-100	96	2	4	57
Second street	–	–	–	–	–	–	–
GTP:							
Guard C, Training street	96	100	77-100	97	2	4	77
Second street	–	–	–	–	–	–	–
2. GTP: Guard J	98	91	88-100	95	4	4	67
Guard S	95	89	60-100	93	2	3	74
3. Component analysis:							
School D	93	91	89-100	92	3	6	80
School C	93	87	87-100	91	2	4	80

KEY: #P Number of different primary observers.
#R Number of different reliability observers.
%R Percentage of occasions when a reliability observer was present.

guard reliability. As before, an agreement was scored when both observers marked yes (no) to indicate that a child had performed a behavior correctly (incorrectly). Unobserved behaviors were scored as in the crossing guard reliability section. Table 1 contains pedestrian and crossing guard reliability data for all experimental studies reported in this research.

Program Costs

The total cost of compensation to crossing guards for time spent in assisting in the production of the training tape and learning to deliver the PSIP was $199.00. The cost of training crossing guards (approximately one hour each) and videotaping training was $102.00. An additional $87.00 was spent for construction of training posters. Hence, the average cost of training each of 522 children was approximately $.74.

The primary objective of Experiment 1 was to ascertain the extent to which the GTP could produce and maintain high levels of training behavior in crossing guards. The second ob-

jective was to determine whether increases in appropriate guard behavior led to substantial changes in pedestrian behavior. Finally, it was important to assess the degree to which pedestrian behavior would generalize to a different street from where training had occurred.

EXPERIMENT 1

METHOD

Students

Seven groups of kindergarteners were chosen to participate in this study. These groups varied in size from five to six children. Two crossing guards located in close proximity to School F were chosen to receive the GTP and administer the PSIP to children.

Training

All groups of children received the PSIP. Both crossing guards in this study received a single session of training of approximately one hour duration. Crossing guards were trained according to the procedures outlined in the General Method section.

Experimental Conditions

The sequence of experimental conditions used to evaluate the effectiveness of the GTP on the ability of the guards to deliver pedestrian training to children is given in the order listed below.

Baseline. Observers noted any instances of appropriate guard training behaviors subsequent to the time children arrived at the curb, during the period when the guard held traffic so each child could cross the street one by one, and prior to the return of children to school.

GTP. During the first day of this condition, each crossing guard received the GTP. No assistance in training children was given to either of the two guards during the remainder of the study. On the same day that guards were trained and on all subsequent days shown in the upper portion of Figure 1, children received the PSIP.

Maintenance (new children trained). After delivering 3 days of pedestrian training to the initial group of children, new groups of children were also trained for 3 days. Guard P trained three new groups of children; guard C trained two new groups.

The sequence of experimental conditions used to evaluate the effectiveness of the PSIP is given in the order listed below.

Baseline. Children crossed the street one by one as the crossing guard held traffic. They received the message, "I want you to cross the street one by one when I stop the cars."

Training. Children received 3 days of the PSIP and the same message given during baseline.

Prompt (second street). After each group had received 3 days of training, children were taken to a second street where they had never been trained and asked to cross the street. They received the message, "I want you to use all the safety steps you learned every time you cross the street." A crossing guard positioned at this street held traffic to ensure the safety of the children during their cross.

RESULTS

As can be seen in the upper portion of Figure 1, neither guard P nor guard C delivered any of the training behaviors specified to teach children how to cross the street safely during the baseline condition. However, after receiving the GTP, a single training session consisting of videotaped and role play instruction, both guards substantially increased their percentage of guard training behaviors. Furthermore, their skill levels remained well above their baseline levels for the duration of the study. The upper half of Figure 1 also shows that as new groups of untrained children were taken to the street corner to be trained, high skill levels of pedestrian behaviors resulted from the training being given by each guard.

During the baseline condition indicated in the lower portion of Figure 1, the level of appropriate street-crossing behavior shown by children was always below 40%. By the third day of training, both groups were at or above 90%

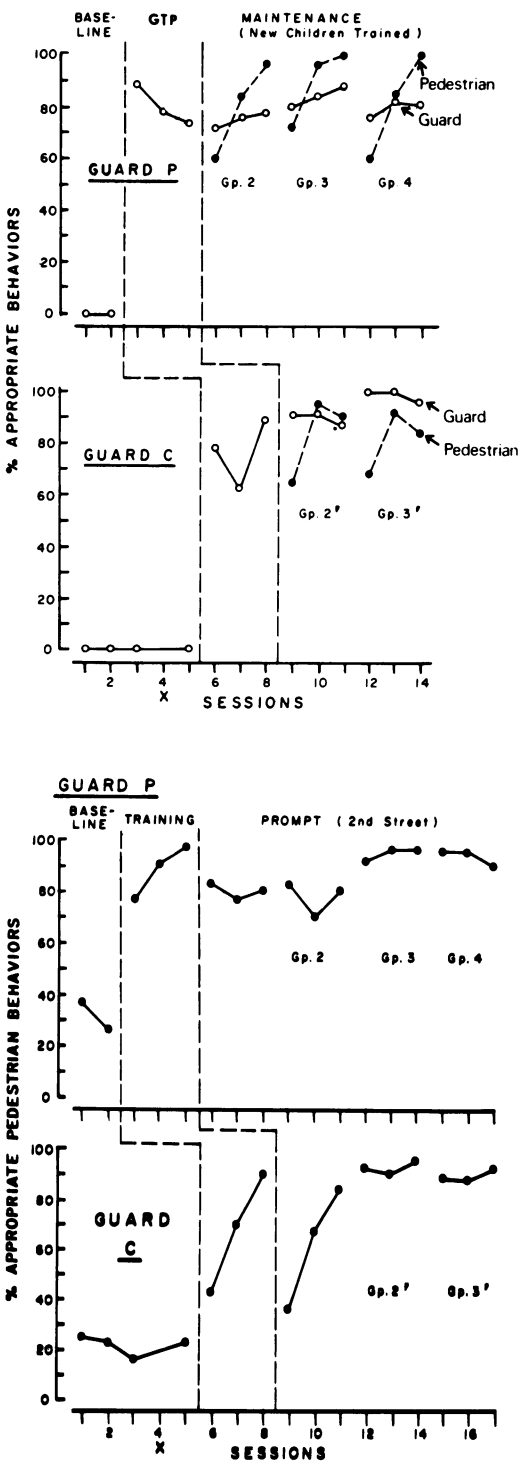

Fig. 1. Upper graph: The percentage of appropriate training behaviors of two crossing guards at School F is shown by the open circles. During maintenance, new groups of children were trained every 3 days. Closed circles represent the percentage of correct pedestrian behavior shown by groups of children on the street where they received initial training. The "X" marks a single day when Guard C was absent. Lower graph: The percentage of appropriate pedestrian behaviors of groups of children at School F. During the baseline and training conditions, results are from the street where each crossing guard gave training; on subsequent days, results are from a second, nearby street. In each graph, initial data that have not been given a group designation come from the same group of children.

correct street-crossing behaviors. When these groups were prompted on a second street where they had never been trained, their level of correct responding remained substantially above baseline. As new groups of children received a brief prompt to use all the safety steps they had learned previously, high levels of appropriate behavior were maintained. In several instances, children crossed at higher levels on the second street than on the street where they had been trained.

Discussion

Taken together, the results shown in the two portions of Figure 1 indicate that the GTP was effective in producing high skill levels of pedestrian training by crossing guards and maintaining these levels over time. Furthermore, this high quality performance generalized to each new group of children who received training. Coincident with these improvements in guard training behaviors were substantial improvements in the pedestrian safety of young children. Only when training was given to children and guards did their respective skill levels increase. Though generalization was never assessed on an unguarded street, children also maintained high levels of appropriate street-crossing behaviors when they crossed a street where they had never been trained.

EXPERIMENT 2

One possible criticism of Experiment 1 is the baseline measure taken on crossing guards' natural inclination to help children learn correct

safety steps in crossing the street. That is, it may be unfair to use a baseline condition that has not prompted the crossing guard to instruct children in pedestrian safety. Consequently, this experiment used a more stringent criterion, a written instructions condition, to compare the effects of the GTP.

It is also possible that in the eventual exportation of the guard training procedures, videotaped and role play training procedures might not be closely adhered to. It seemed natural that a written set of instructions might be substituted as a convenient and potentially effective method for training guards. For the above reasons, a test was conducted to determine the effectiveness of a written instructions condition on the ability of crossing guards to skillfully implement the PSIP.

METHOD

Students

Eight groups of five or six kindergarteners and first graders at School E were chosen to participate in this study. The two crossing guards chosen to participate in this study worked at the closest major intersections near the school.

Training

All groups of children received the PSIP. Both crossing guards received a set of written instructions specifying the procedures for each phase of the training package. These written instructions consisted of a four-page script detailing the motor and verbal behaviors that should be given during training. Two adjacent columns entitled "What you should do" and "What you should say" included all those guard training behaviors given in the GTP. Subsequently, both guards received a single session of the GTP.

Experimental Conditions

The sequence of experimental conditions in this study is shown in Figure 2.

Baseline. During baseline, any instance of pedestrian training steps given to children by guards was recorded.

Written instructions. Important features of the training given to children were written in a set of instructions provided to each of the guards. After completing their responsibilities in the morning, both guards were told to take the instructions home, to read them carefully, and to keep track of the time spent in learning the instructions so they could be reimbursed for their efforts. In the afternoon before pedestrian training was given, the first author answered the questions asked by each guard regarding pedestrian training.

GTP. During the first day of this condition, each crossing guard received the GTP.

Prompting (new children trained). Verbal instruction, modeling appropriate guard behavior, and role playing by the guard were given by the first author in 5- to 10-min review sessions to increase low levels of training skills. Each guard received these instructions on the first day that each new group of children arrived at the corner for training. In contrast to Experiment 1, these children only crossed the street on which they had received training; they did not cross a second street as part of the evaluation of their training.

RESULTS

The results shown in the upper portion of Figure 2 indicate that the percentage of appropriate guard behavior was quite low during baseline. Guard J did deliver a small percentage of the PSIP. During written instructions, there was a small increase in appropriate guard behavior with Guard J and a somewhat larger increase with Guard S. Anecdotally, Guard S was seen reading over the written instructions for several days of this condition during the period prior to the arrival of children at the street corner. During pedestrian training, Guard S would occasionally ask the children to read the safety steps from the training poster rather than read them himself.

The GTP condition produced a small, overall increase in guard performance, but the slope of the trend was negative in each instance. During prompting, several remedial review sessions

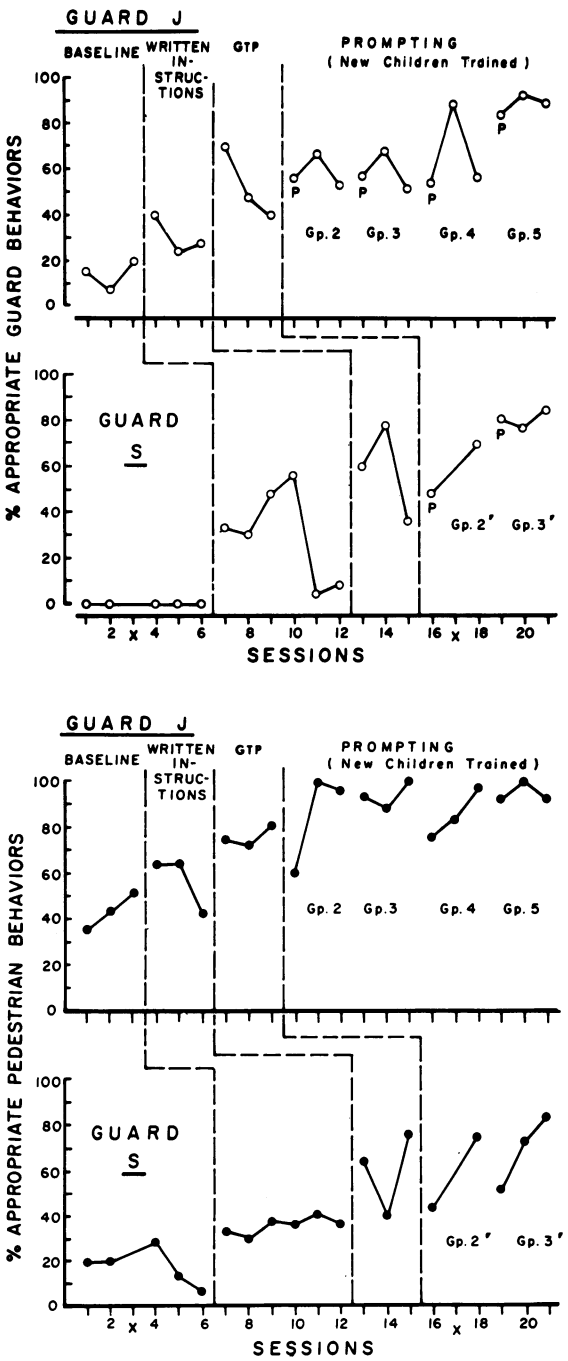

Fig. 2. Upper graph: The percentage of appropriate guard behaviors. During brief review sessions (labeled "P"), both guards received instructions to increase low levels of training skills. New groups of children at School E were trained every 3 days during prompting. In each graph, initial data that have not been given a group designation come from the same group of children. Days when Guard S was absent are labeled "X." Lower graph: The percentage of appropriate pedestrian behaviors. During prompting (new children trained), successive groups of children were given the PSIP for 3 days.

(four with Guard J and two with Guard S) were required to bring guards to high skill levels subsequent to their training with Written Instructions. During the last 3 days Guard J gave training during the prompting condition, skill level was always above 80%; Guard S's skill level remained above 75% during this time.

Children trained by guards who had received written instructions (see lower portion of Figure 2) increased appropriate pedestrian behavior to moderate skill levels. Continuation of pedestrian training after each guard had received the GTP resulted in further pedestrian skills increases in both groups, though not to the customary high skill levels found in children whose guards had received only the GTP. During the prompting condition when new groups of children were trained, there was considerable variation in pedestrian skills within the 3-day training periods, and the skill levels attained by these groups of children trained by Guard S were moderate. Those groups of children whose performance had not reached high skill levels prior to the completion of the study were taken to the street corner again until high skill levels were attained.

Discussion

One could conclude from this study that written instructions do lead to small increases in appropriate guard training behaviors. However, additional prompting was necessary to bring guards to high skill levels even after they had received the GTP. It may be more efficient in the long run to guarantee that guard training is delivered as planned than to take the extra time to correct guards' mistakes after they receive less than an optimum set of training procedures. The GTP was not sufficient to maintain increased skill levels after 3 days of the written instructions condition. Additionally, since writ-

ten instructions did lead to small increases in guard training behavior, the use of the baseline condition in Experiment 1 probably leads to a slight *over*estimate of the extent of the change produced by the GTP.

Furthermore, the changes in appropriate pedestrian behavior during the period when crossing guards received written instructions were also minimal. The lower levels of guard training behaviors attributable to the weaker instructional procedures resulted in moderate levels of appropriate pedestrian behavior and variable rates of performance during both the GTP and the prompting phases of the experiment.

EXPERIMENT 3

In any realistic consideration of the exportation of the PSIP to other communities, the possibility that the program would not be given in its entirety becomes a critical concern. If a briefer version of the package was to be implemented, it is quite plausible that only the "show and tell" phases of training would be used since these portions are least demanding of time and effort by training staff. From a research perspective, a separation of the "show and tell" components of the PSIP from the "ask and let" components was also logical since feedback is a part of the two latter phases but not a part of the two former phases. Such an analysis of the components of the package associated with its effectiveness is important so that one could stress to potential users the necessity of closely following procedures. Therefore, the purpose of Experiment 3 was to determine the effectiveness of the combined "show and tell" portions of the PSIP compared to the combined "ask and let," feedback portions of training.

METHOD

Students

One group of six and another group of five kindergarteners and first graders at School D and two groups of six kindergarteners and first graders at School C participated in this study. One crossing guard at each school agreed to administer training as outlined below.

Training

Each group of children first received only the show and tell portions of training before receiving the complete PSIP. Both crossing guards had previously been trained to administer pedestrian training at high skill levels.

Experimental Conditions

A multiple-baseline design was used to analyze the components associated with safe street crossing. This analysis was conducted at School D, then replicated at School C, using the following order of experimental conditions.

Baseline. Children were asked to cross the street as the crossing guard held traffic.

Show and tell. Only the show and tell portion of training was given.

Show and tell + feedback. In addition to the show and tell portion of training, guard feedback was given to the children when they were asked to practice at the curb (the "ask" condition) and the actual street crossing portion of training (the "let" condition). In other words, the complete PSIP was given to both groups during this condition.

Prompt. Children were reminded to use the safety steps each time they crossed the street.

RESULTS

The show and tell portions of the training package (see Figure 3) were associated with small changes in behavior with the exception of Group I in School C (see lower portion of Figure 3). In contrast, the percentage of correct behaviors shown during the complete PSIP averaged at or above 70% for the four groups of children who were trained. A brief reminder to continue to cross safely maintained the high levels of behavior produced by training.

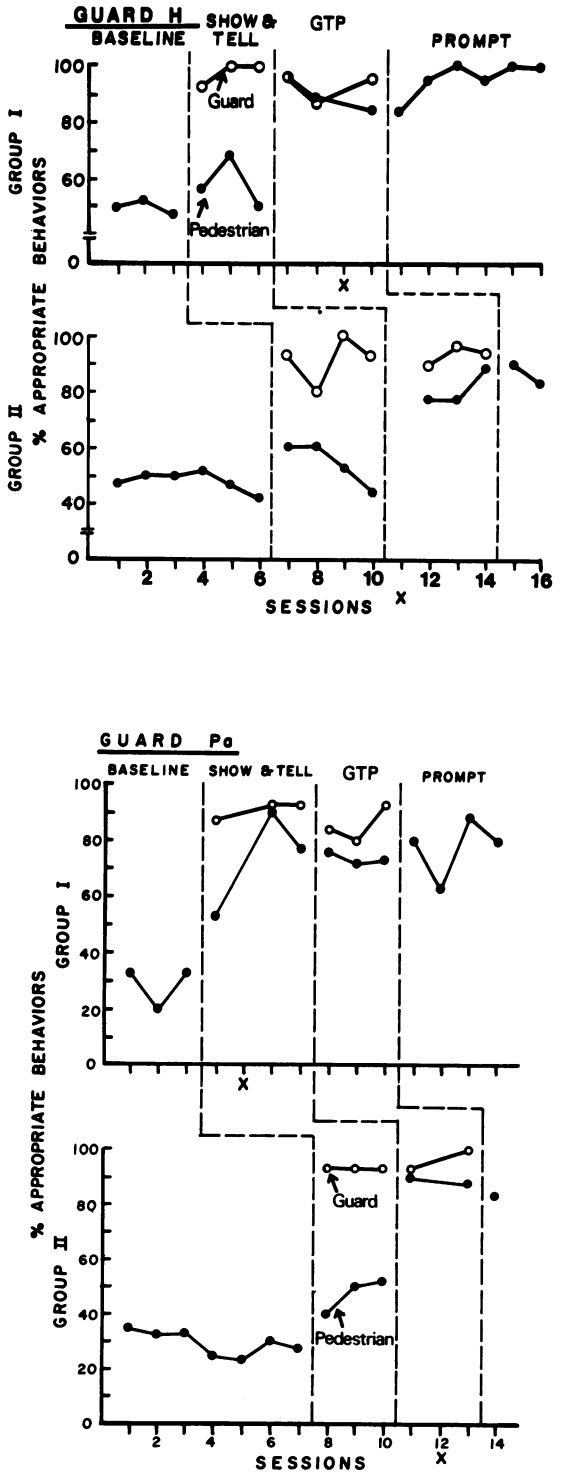

Fig. 3. The percentage of appropriate pedestrian behaviors (closed circles) and guard training behaviors (open circles) at School D (upper graph) and School C (lower graph). In both graphs, "X" indicates days when crossing guards were unable to complete pedestrian training due to the dismissal from school of children not involved in the research.

Discussion

Merely showing and telling children how to cross the street safely led to minimal behavior change in all but one group of children. Furthermore, the relatively low levels of pedestrian safety behavior shown during the show and tell portion of training cannot be attributed to inadequate training by the crossing guard since the percentage of show and tell behaviors demonstrated was documented to be relatively high. Apparently, the opportunity for children to practice and receive feedback and praise is critical to successful pedestrian performance with most children.

GENERAL DISCUSSION

Adult crossing guards located in close proximity to elementary schools were trained by videotape and role play procedures to skillfully administer pedestrian safety training to kindergarteners and first graders. Not a single injury or dangerous confrontation with a motor vehicle occurred during the duration of the program. Validation studies of the PSIP and GTP produced strong evidence of their effectiveness while cost figures suggested that the beneficial changes were accomplished at minimal expense.

Both training programs were replicated with numerous crossing guards and children. The GTP was successful in producing high instructional levels of pedestrian safety. Furthermore, when these instructions were given to successive small groups of children, their level of appropriate street crossing changed dramatically on a street where training was given and substantially on a second street where training was never delivered. Additional analyses of procedures used to train crossing guards indicated that weaker training methods, such as the particular written instructions training procedures used in this re-

search, were unlikely to be associated with high training levels by crossing guards or with consistently high pedestrian performance levels by children.

Additional research indicated that merely showing and telling children how to cross the street safely did not produce *consistently* high levels of street-crossing behaviors. Apparently, simply showing and telling may be an effective procedure with some children, though it is not evident how one would predict which particular children this minimal training is likely to benefit in any large-scale implementation. It was not until children were given the opportunity to practice pedestrian safety steps and guards delivered feedback and praise relative to this active performance that increases in appropriate responding were substantial in all children.

Collectively, these experiments argue for the applied significance of the procedures developed in this project for training crossing guards to teach K-1 children appropriate street-crossing behaviors. The superiority of the more direct instructional procedures used in these studies (e.g., role playing, modeling, and verbal feedback) over such indirect procedures as written and verbal instructions is consistent with previous research (e.g., Gardner, 1972; Nay, 1975; Lutzker & Drake, Note 2).

Future pedestrian safety research might use crossing guards as potential change agents for carrying out the procedures designed and evaluated in this project, though other responsible adults may similarly serve this function. The findings also suggest that the training procedures outlined explicitly in this paper be followed closely and argue for a "behavioral prescription" accompanying the training materials. The prescription would caution the user against improvisation of the training procedures suggested, as other procedures might lead to potentially harmful side effects.

One problem illustrated in these studies is the increased range of individual abilities likely to be confronted in large-scale evaluations of training programs. Designing a single intervention to accommodate this diverse population is complicated by the criterion of producing a technology of behavior change likely to be effective for each target person yet not wasteful of money or trainer time. The GTP appeared to be an effective means of training crossing guards to teach pedestrian safety to a heterogeneous population of normal children. With weaker instructional methods (e.g., written instructions), guards did not closely follow the PSIP, yet some groups of children performed appropriately, at least some of the time. When children received only the show and tell portions of training, one of four groups substantially increased its level of correct responding. Clearly, the weaker training methods tested in this research did not work with all children or all guards, while the effects of the complete version of the GTP and PSIP were much larger and more uniform. The possibility that different instructional techniques or different strengths of the same instructional technique can be tailored to people of differing ability levels must await future research.

As in all research studies, inferences beyond the context used to judge the effectiveness of specific training programs must be made with care. In this study, crossing guards were always present when children crossed the street, and the cautious researcher cannot safely assume that pedestrian safety skills will generalize to other unguarded streets (see Yeaton & Bailey, 1978, for further qualifications on the issue of generalization of pedestrian safety skills to unguarded streets).

The exportation of training packages presents a host of questions whose answers may be critical to the success of the program at this level of analysis. For example, will crossing guards continue to give appropriate instruction when their performance is unmonitored? Second, can initial guard training be given by a police department supervisor or whomever is responsible for the training of guards? Third, will pedestrian safety skills generalize across time and settings when crossing guards administer training? If not, will remediation procedures (see Yeaton & Bailey,

1978) be effective? Fourth, will the large-scale implementation of preventive practices such as pedestrian safety training be associated with a decrease in the "bottom line" dependent variables, viz., pedestrian deaths and injuries (Yeaton, Greene, & Bailey, 1981)? Fifth, is it more cost-effective to teach pedestrian safety at school crosswalks than in a classroom (Neef, Iwata, & Page, 1978)?

These are the types of questions that are best answered by a sequence of evaluative studies whose common purpose is to test the feasibility and effectiveness of behavioral techniques as they are exported to the community or beyond. Without these systematic analyses, successful utilization of programs such as pedestrian safety are unlikely to occur.

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